IJTRET "Voice of Innovative Minds"
doi.org.10.54473/IJTRET.2023.7506
International Journal of Trendy Research in Engineering and Technology
Volume 7 Issue 5 October 2023
ISSN No.2582-0958

HEALTHPIX: THE VIRTUAL ASSISTANT

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Received 05 November 2023 Received in revised form 22 November 2023 Accepted 26 November 2023
Available online 29 November 2023

ABSTRACT

To start a good life, healthcare is more important, but it very difficult to obtain a consultation with a doctor in case of health issues. The proposed idea is to create a care Chabot system using artificial intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. Detecting the calories of eating food and suggesting the exercises and food items, a smartwatch which is cheap and useful for people. The Chabot system provides text/voice assistance to communicate friendly with the bot. This bot will provide which type of disease you suffer from based on your given symptoms and provide doctor details based on the disease you suffer. The Chabot will clarify the user's disease with a series of questions and symptoms confirmation will be done. The disease will be categorized as a major and minor disease. If major disease the bot will suggest with doctor details and analgesics for further treatments. As an advanced system that suggests healthy food items by detecting the calories of the food in real-time and also suggests the needed workout for each and every individual. It will also incorporate a smart watch to detect the heartbeat rate, SPO2, Stress Level, Water level and keep track of their health. Our technology includes a multilingual Chabot that can handle different languages. By determining the user's language from the input, our Chabot can handle many languages, switch between them automatically, and respond in the user's native tongue. Customers may easily communicate with your Chabot in their own language. This application is going to be very helpful to the users as they can easily get medical assistance without paying; Also they are getting all this just at their home using their Smartphone.

Keywords: Diagnosis, Calorie Detection, Exercise, Diet plan, SPO2, Multilingual Chatbot.

I. INTRODUCTION

Healthcare plays a vital role in society, aiming to deliver medical services and promote the well-being of individuals. In recent times, the healthcare industry has faced increasingly complex challenges, necessitating novel approaches and initiatives. The core focus of this project is to enhance the accessibility of high-quality healthcare services, improve patient outcomes, and

ensure the efficient and economical delivery of care. By meticulously planning, collaborating, and utilizing state-of-the-art technology, this endeavor aims to tackle the key issues confronting the healthcare sector.

The primary goal of this project is to harness digital health solutions to optimize healthcare provision. Given the rapid advancements in technology, there exists immense potential to enhance patient care through the utilization of telemedicine, electronic health records, and remote monitoring devices. By integrating these digital solutions, healthcare providers can streamline processes, enhance communication, and ultimately elevate the patient's experience.

Nowadays, the significance of healthcare in our daily lives cannot be overstated. In today's fast-paced world, individuals are engrossed in their home-based and office responsibilities, often becoming engrossed in Internet activities. Unfortunately, this leads to a neglect of personal health[1], resulting in a reluctance to seek medical attention for minor ailments. This tendency, if left unchecked, can escalate into more serious health issues. Hence, proposing the creation of an AI-powered healthcare chatbot system emerges as a viable solution[2-4]. This innovative system would be capable of preliminary disease diagnosis and furnishing essential information about the ailment prior to a consultation with a physician. This empowers patients with knowledge about their condition, consequently enhancing their overall well-being. Users would have access to a wide array of disease-related information. The system's application would employ a question-and-answer framework in the form of a

chatbot to address user inquiries[2]. Responses to queries would be generated based on the user's specific question. Crucial keywords from the input would be extracted, and responses tailored accordingly. Should a relevant match or pertinent information be identified, similar responses would be presented. The bot would conduct a preliminary assessment of the user's symptoms to ascertain the type of ailment, and additionally provide information on specialist physicians, pain relief options, and dietary recommendations. By leveraging this application system, individuals could potentially mitigate health issues. The development of this system aims to curtail healthcare expenses and save users valuable time, particularly in situations where immediate medical attention may not be readily accessible.

II. EXISTING SYSTEM

Many virtual assistant systems are existing. But they lack data privacy, low speed and have inaccurate data. The performance of chatbots is limited[5]. It always relies on manual changes in language. Some methods exist for dietary assessments which involve self-reporting and manually recorded instruments. However it has some issues with the evaluation of calorie consumption. Calorie consumption by a participant is prone to be biased, i.e. underestimating and under-reporting of food intake to increase the accuracy and to reduce the bias current methods are enhanced by mobile cloud computing systems, which make use of devices such as smartphones to capture dietary and calorie information[6-10]. However, users still have to enter the information manually. Though plenty of research and development efforts have been made in the field of visual-based dietary and calorie information analysis, the efficient extraction of information from food images remains a challenging issue. Discrete cosine transform is used to portion the food and it is searched by segmentation process. To classify K-NN (k nearest neighbor) is used which takes much time to train the images and classify[11-13].

1. If data is not assumed properly, data loss may occur. It only gives about 90% accuracy in predicting the captured food.
2. Since there is no user id and password protection any one can view the details inside that application.
3. The System provides only the amount of calorie, fat, crabs, protein in the food captured. Hence the user may not know the limitation range for the intake of the above.

III. PROPOSED SYSTEM

- Accurate and Specific Medication: Our online platform securely stores patients' health records on a remote server, verified by authorized medical professionals. It takes individual allergies into consideration when offering medication recommendations.
- Virtual and In-Person Consultations: Our platform facilitates both virtual consultations via video calls and in-person appointments with nearby doctors.
- Convenient Medicine Delivery: We've partnered with select pharmacies to enable users to conveniently receive their prescribed medications at their doorstep through our online delivery service.
- Round-the-Clock Assistance: Our platform ensures users have access to support 24 hours a day, 7 days a week, accessible from anywhere at any time.
- Calorie Monitoring: By instantly detecting the calorie content of food, we provide tailored suggestions for a healthy diet, along with personalized workout recommendations for each individual.
- Stable body maintenance: A Hardware Model incorporated with sensor to check the Heart Beat rate, Stress level, Water Hydrations, etc. Giving detailed information of disease and its Diagnosis.

IV. SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

1. Display: the device will have an OLED or LCD display screen that shows the time, fitness stats, notifications, and other information. The size and type of display may vary depending on the model.

2. Sensors:

- Heart Rate Sensor: The device has a heart rate sensor that measures your heart rate continuously or on-demand.
- 3-Axis Accelerometer: This sensor tracks your movement and steps taken.
- Gyroscope: Some models have a gyroscope to detect rotational movements and orientation changes.
- Altimeter: An altimeter measures changes in altitude and helps calculate the number of floors climbed.
- GPS (Global Positioning System): have built-in GPS for accurate outdoor tracking location during emergency.

SOFTWARE REQUIREMENTS:

Incorporate natural language processing (NLP). Machine learning techniques to analyze and handle medical text and speech data. Utilizing libraries such, as spaCy, as specialized healthcare NLP libraries can provide significant value[14].

HIPAA Compliance;

Make certain that your software infrastructure and development procedures align with the guidelines established by the Health Insurance Portability and Accountability Act (HIPAA). These rules oversee the protection and confidentiality of healthcare information.

Data Encryption;

Implement encryption methods to safeguard the transmission and storage of data. Employ encryption protocols like SSL/TLS for communication.

User Authentication and Authorization;

Establish user authentication and authorization mechanisms to control access to records prioritizing data privacy.

Database;

Utilize scalable databases for storing records, appointments and other pertinent information. Consider leveraging HIPAA compliant cloud databases or on premises solutions.

Speech Recognition and Synthesis;

For assistants that involve voice interactions integrate speech recognition and synthesis tools or APIs to facilitate seamless voice input/output.

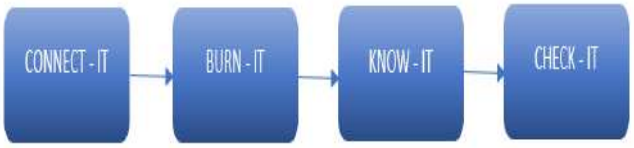
Chatbot Framework;

Integrate a chatbot framework or library for natural language conversations with users. Popular frameworks like Rasa or Microsoft Bot Framework can be considered.

Telemedicine Integration;

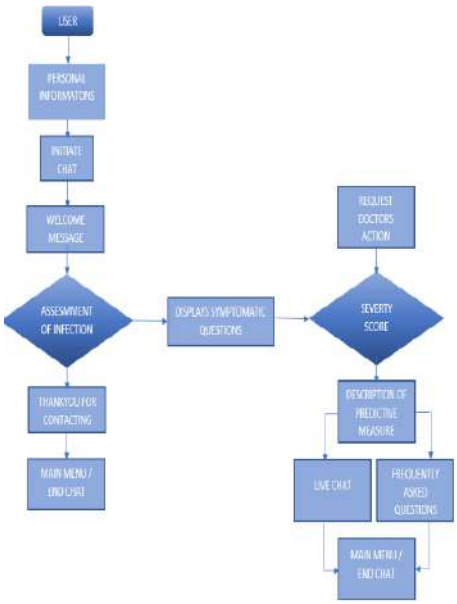
If your virtual medical assistant supports telemedicine functionalities ensure integration, with video conferencing platforms while adhering to healthcare regulations. For transmitting healthcare data it is crucial to employ communication protocols. This includes using HTTPS for web applications and encrypted messaging for chatbots.

V.MODULES



MODULE 1: CONNECT – IT

Creating a Chabot for diagnosis of disease and suggesting the doctor of specialization. Voice Assistant will guide the user with their own mother tongue. It also has a first aid diagnosis for the problems of the users.



International Journal of Trendy Research in Engineering and Technology
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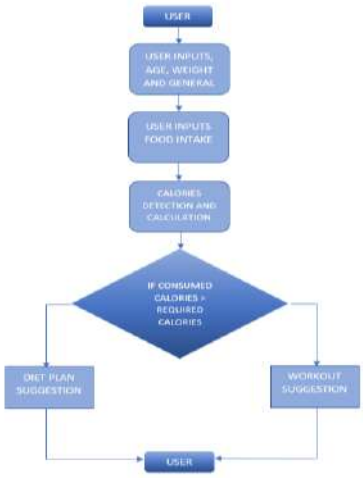
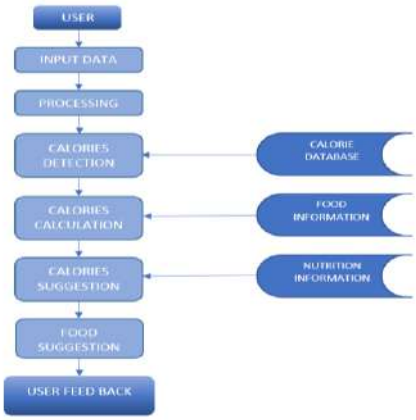
MODULE 2: BURN – IT

Suggesting workouts to the users for both weight gaining and weight losing. The Website that we have created for suggesting the workouts will help the users effectively. It just asks for the basic details like age, height, weight, etc.



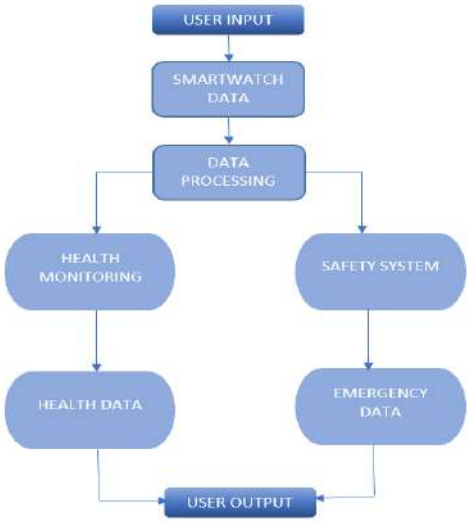
MODULE 3: KNOW – IT

Detecting Calories in the taking food real - time and calculating the calories present in the food. Then it will suggest the amount of calories that needed to be taken including the food. So it will suggest a food item with the needed amount of calories.



MODULE 4: CHECK – IT

A smart watch and a handable kit which will sense the heart beat rate, SPO2, Hydration level, Stress level, GPS, etc. will help the user guide them for a healthy life style. We also incorporate a safety system in this watch which is for a emergency purpose.



VI.ALGORITHMS

We are using two algorithms to implement a health care chatbot system[1].

1. TF-IDF (Term frequency-inverse data frequency)
2. Cosine similarity algorithm

TF-IDF

Term Frequency (TF) refers to a technique commonly employed in text analysis models. It involves the exclusion of common stop words. An alternative approach is to assess the significance of words by employing TF-IDF. In this method, high TF values signify the importance of a term within a particular document. It is calculated as the frequency of a word's occurrence in a document divided by the total number of words in that document. Each document possesses its unique term frequency.

$$tf_{i,j} = n_{i,j} / \Sigma_k n_{i,j}$$

Inverse Document Frequency

The logarithm of the total documents divided by the documents containing the specific word 'w'. IDF serves to gauge the significance of a term in a set of documents. A higher IDF suggests that a term is infrequent and potentially holds greater weight. Essentially, IDF assesses the influence of less common words across the entire document collection.

$$idf(w) = \log(N/df_t)$$

Cosine Similarity Algorithm

Cosine similarity is a metric that quantifies the likeness between two non-zero vectors within a space defined by inner products. It assesses the cosine of the angle formed between these vectors. Additionally, this method finds application in evaluating the internal coherence of clusters in the realm of data mining.

Algorithms Role in the project:

- TF-IDF can be applied to text in various languages, making it versatile for multilingual applications.
- It works well in a wide range of text analysis tasks, including document clustering, document categorization, and text classification.
- Cosine Similarity is used in document retrieval systems to rank documents by relevance to a query.

VII. STANDOUTS

- WITH COMPELLING PRODUCT: High precision medical assistance that can replace nurses and health workers reducing the bed needs during covid.
- THROUGH AUTHENTIC MESSAGING GENERATING STATISTICS REPORT: Technology that can diagnose your psychology and health conditions with just one message.
- USING PROPER PLATFORMS: High level programming language and front-end enabling compatibility and efficiency
- IDEAL STATE : Ideal state looks at the perfect health, the well being of an individual. An individual needs to be healthy on three levels; these include psychically, emotionally and mentally and when one is free from any health issues. This ensures the right healthcare service at the right time.
- MULTI-LINGUAL : The Chatbot that connects the doctor and the user is multilingual.
- REAL TIME DETECTION : The calories detection will be detected in real time.

VIII. BUSINESS STRATEGY

1. Improving Care and Brand Loyalty With Chatbots

Healthcare chatbots enhance accessibility to your organization, promoting seamless care coordination, availability, and utilization. These initiatives have the potential to increase revenue and foster stronger patient allegiance to your brand.

2. *Reducing colonoscopy no-shows and cancellations*

Prior to the introduction of Colonoscopy Health Chat by Northwell Health based in New York, there were elevated levels of appointment cancellations and no-shows. After all, undergoing a colonoscopy can be a source of anxiety for many. The chatbot effectively alleviated these concerns through engaging and responsive interactions. Following the appointment booking, the chatbot dispatched informative materials through text or email, offering insights via video animations and outlining the advantages of this crucial cancer screening procedure. These considerate prompts significantly eased the overall patient journey, subsequently enhancing the probability of adherence to the screening.

3. Canvas Pitch

Our intended market is a worldwide clientele. We are primarily creating this merchandise for all socioeconomic classes to provide healthcare right at their door. This offers an answer to issues like not taking the wrong medications, or not eating enough nutritious food, among others. Our key aim is to find solutions to all of these problems, so we created a product that offers precise and necessary medication, 24/7 support, appointment scheduling, a proper diet, and body upkeep. This product will succeed because it offers a fix for all the issues facing the average person. We can infer from this that the merchandise would find success on the global market.

4. Deck Business Model

The healthcare application market is a huge one. This pitch deck targets the market opportunity in this world of digital health technology. It starts with the problems that you plan to identify and tackle. This proposal (or business opportunity) happens to provide a solution for secure, Proper and Precise Medication, Diet plan and stable body to patients for a healthy and comfortable lifestyle. One of the solutions

offered is using a web portal for calorie detection and suggesting diet plans. It also has the perfect design and strategy for you to key-in growth drivers or investors. The proposal will take the electronic medical healthcare market to another extreme. It mainly relies on

IX. VISION

The vision of our project is to make healthcare accessible for all. Nowadays, Quality healthcare is accessible only to people with good economic standing. To break this barrier we are creating healthpix which would be free and available to people of all economic stands and lead a healthy life. Our main motive is to change healthcare as a necessity rather than luxury.

X. CONCLUSION

- A chatbot serves as an excellent medium for human-machine interactions.
- It is determined that chatbots are easily navigable and accessible to individuals of all backgrounds.
- The chatbot delivers tailored assessments based on presented symptoms.
- This application is going to be very helpful to the users as they can easily get medical assistance without paying, also they are getting all this just at their home using their smartphone.
- The Chabot system that aids in determining how to change diet to maintain the same amount of balanced food, to monitor body stability parameters like heartbeat and stress level, diagnosing diseases based on symptoms and to urge users to constantly live a healthy and balanced lifestyle.
- It encourages users to create goals for a balanced diet and shift their regular eating habits in a healthy direction.

V. FUTURE SCOPE STRATEGY:

- Extend telehealth services to cover a broader range of specialties and healthcare needs, ensuring access for remote and underserved populations.
- Enable patients to have control over their health records, allowing them to share data securely with various healthcare providers.
- Invest in preventive healthcare initiatives and patient education to reduce the burden of chronic diseases and improve overall wellness
- Foster partnerships and Collaborations with other healthcare organizations, pharmaceutical companies, and technology.

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